(B) Federal Railways.

1. **General.**—On the 1st January, 1911, the Commonwealth Government took over the Northern Territory from the South Australian Government, and at the same time the railways from Darwin to Pine Creek, in the Northern Territory, and from Port Augusta to Oodnadatta, in South Australia, came under its control. Subsequently, the construction of a transcontinental line from Port Augusta, in South Australia, to Kalgoorlie, in Western Australia, was undertaken by the Commonwealth Government, while a line has been constructed in the Federal Territory, connecting Canberra with the New South Wales railway system at Queanbeyan. In 1917 an Act was passed by which all the Commonwealth railways are vested in a Commissioner.

2. **Northern Territory Railway (Darwin to Katherine).**—The line from Darwin to Pine Creek at first came under the jurisdiction of the Department of External Affairs, and was worked under the Administrator of the Northern Territory. As mentioned above, the management of this railway is now vested in the Commissioner.

Particulars as to the working of this line for the year 1901-2 prior to its passing under the control of the Commonwealth Government will be found in sub-section C, State Government Railways.

In the Northern Territory Acceptance Act, the construction of a transcontinental line from South Australia is provided for. The extension of the line from Pine Creek to Katherine River has been completed, and the first train ran through to Katherine on 13th May, 1917.

3. **Oodnadatta Line.**—This line was taken over by the Commonwealth Government from 1st January, 1911, but was held under lease by the South Australian Government until 31st December, 1913. From the 1st January, 1914, the line has been worked by the South Australian Government for and on behalf of the Commonwealth. It is provided in the Northern Territory Acceptance Act that the Commonwealth shall annually reimburse the State with the interest payable on the amount of loans raised by the State for the purpose of constructing the railway, and the agreement for working the line prescribes that the Commonwealth is responsible to the State for any financial loss incurred by the State in the working and management of the railway, but is entitled to receive from the State any profit made in such working and management.

4. **Trans-Australian Railway (Kalgoorlie to Port Augusta).**—A Federal Act passed in 1907 provided for the expenditure of a sum of £20,000 for a preliminary survey of a railway line connecting Western Australia with the eastern States. This survey was commenced in 1908, and was completed in March, 1909. The route *via* Tarcoola was, for several reasons, chosen in preference to that *via* Gawler Range and Fowler's Bay. The estimated cost of construction and equipment of the line on the basis of a 4-ft. 8½-in. gauge, from Port Augusta in South Australia to Kalgoorlie in the Western Australian goldfields, a distance of 1063 miles, was £4,045,000. In September, 1911, a Bill was introduced into the Commonwealth Parliament to authorise the construction of the line, and it became law in December following. In South Australia an Act was passed enabling the Commonwealth to acquire lands for the railway in South Australia not exceeding one-eighth of a mile wide on either side of the line, but no town lands are to be included at any time. In Western Australia, an Act was also passed by which all necessary lands are to be granted to the Commonwealth for railway purposes. A Railway Construction Department was created by the Federal Government to carry out the work, which was commenced at Port Augusta in September, 1912. On 12th September the ceremony of cutting the first sod was performed at Port Augusta by the Governor-General, Lord Denman, in the presence

of a representative gathering, and on the 12th February, 1913, a like ceremony was performed at Kalgoorlie by the Prime Minister of the Commonwealth (the Right Hon. Andrew Fisher), and the line was thus commenced at both ends.

The country traversed by the new line may be roughly divided into four sections from Kalgoorlie eastward.

The first section comprises the granite plateau extending for 167 miles out from Kalgoorlie. Much of the country on this section is fairly well timbered with salmon gums and other eucalypts, running up to 50 or 60 feet in height. Kurrajong and sandalwood are also fairly abundant. Throughout there is a luxuriant growth of wild flowers.

The second section is "the limestone plain," which runs for 450 miles to the east from the edge of the granite country. In this section the eucalypts suddenly disappear, and are not seen again until the mallee gums of the bolder sandhills on the eastern edge of the plain are reached. The open plain comes into view 207 miles out, and thence forward the only signs of growth to be observed are the saltbush and blue bush.

About 290 miles out the line runs on to the Nullarbor Plain. One feature of this part of the line should be mentioned, viz., that it runs straight for no less than 309 miles. This is believed to be the longest section of straight-line railway in the world.

Near Loongana, 336 miles out, certain caves are situated, the principal of which is Lynch's.

The South Australian border is reached at a point 453.94 miles out, a small stone cairn marking the boundary. At 605 miles trees are again met with, but they are small and do not grow more than ten to twelve feet high. The limestone plain is left at about 624 miles out.

The third section is the belt of sandhills on the eastern edge of the limestone region, through which the line runs for about 50 miles. In a state of nature, there are no shifting sandhills about this part of the line, as there is a fairly thick growth of small trees, Mallee gums and others, but when the surface is cleared, the soil is easily removed by the wind, and the bigger cuttings for the line have had to be faced with stone.

The fourth section comprises the stretch of country extending for nearly 400 miles from the eastern edge of the sandhills to Port Augusta. For about 100 miles the line runs over red soil plains and undulating country, which give promise of pastoral and possibly agricultural uses.

At Wynbring, 730 miles out, the granite again comes to the surface. One of the most important places on this section is Tarcoola, at which gold mining has been carried on for some time past. East of Tarcoola the "Lake" country is entered. The lakes in this district are merely vast shallow pans, which are beds of salt in dry seasons and contain water only after rains. It may be mentioned that the line does not cross a single permanent stream of water at any part of its length of 1051.73 miles.

At first preparatory work at each end of the line had to be done, and it was not until March, 1913, that any platelaying had been carried out.

By 30th June, 1913, 3½ miles of line on the 3-ft. 6-in. gauge, and 1 mile on the 4-ft. 8½-in. gauge, had been laid in the depôt at Kalgoorlie, the corresponding lengths at Port Augusta being 4½ and 2½ miles respectively.

Platelaying on the main line was commenced on the eastern division on April, 1913, and on the western division in May, 1913.

The rate of progress in the construction of both ends of the line will be seen on reference to the following table :—

RATE OF CONSTRUCTION OF LINE.

Date.	Position of Rail Head.		Total Length Constructed.
	Ex Kalgoorlie.	Ex Port Augusta.	
	Mls. Chs.	Mls. Chs.	Mls. Chs.
1913—Sept. 1	*8 33	9 40	15 33
Oct. 8	*8 33	25 00	30 73
Nov. 1	*8 33	36 74	42 67
,, 18	12 40	...	...
1914—Feb. 1	39 40	63 00	102 40
April 1	82 40	69 56	152 16
June 1	82 40	84 68½	167 28½
Dec. 1	135 60	137 64	273 44
1915—Mar. 1	190 32	200 68	391 20
June 1	254 23	265 73	520 16
Sept. 1	320 68	304 25	625 13
Dec. 1	383 27	330 72	714 19
1916—Mar. 1	411 30	338 73	750 23
June 30	411 30	361 64	773 14
Aug. 28	454 70	...	...
Sept. 29	478 75	395 58	874 53
1917—Jan. 31	535 37	406 9	941 46
June 30	546 43	411 57	958 20
Oct. 17	621 58	430 00	1051 58

* Exclusive of 2¾ miles from Kalgoorlie to the Depôt, which was completed in November, 1913.

In the above table it will be seen that between 1st September, 1913, and 17th October, 1917, the date on which the eastern and western divisions met at 621 miles 58 chains ex Kalgoorlie, a total mileage of 1036 miles 35 chains was completed. Including Sundays and holidays this gave an average of 0.69 mile of line per day; omitting Sundays the average was 0.8 mile of line per day. As there was in the course of the work a certain amount of broken time owing to lack of materials, and also labour difficulties, the last average is not unsatisfactory, more especially when the conditions which had to be encountered owing to the nature of the country traversed by the line are taken into consideration.

The permanent way consists of rails weighing 80 lbs. to the yard and is a single line throughout, with the exception of the lines at the terminal stations. The rails vary in length, some being 33 feet and others 45 feet, the latter having been adopted to reduce the number of rail joints. The sleepers were at first 9 feet long, 10 inches wide by 5 inches in depth. Subsequently they were standardised at 8 feet 6 inches long, 9 inches wide and 5 inches in depth, thus effecting a material saving in timber.

Ballasting has been effected over a limited length of line so far, but is being carried on regularly, though not on a very extensive scale at present.

The stations at the terminal points are of the usual pattern with raised platforms and verandah roofs. That at Kalgoorlie is a continuation of the station belonging to the Western Australian Government railways, the trains on the respective systems being run on opposite sides of the same platform in order to facilitate a rapid exchange of traffic.

At Port Augusta it was necessary to erect a new station on a fresh site, the original station site being entirely unsuitable for the purpose of the new line. The station buildings have been constructed so as to accommodate the officials of the various departments connected with the railway. Engineering and other shops are in operation to carry out the erection and repair of the locomotives and other rolling stock. It is the intention of the Railway Department to undertake the construction of all the rolling stock required for its lines when the conditions for such construction become favourable.

Provision has also been made at Kalgoorlie for the repairs to rolling stock and other railway material.

The intermediate stations on the line have no platforms, the passenger rolling stock being designed so that passengers can get on or off the train without any difficulty at the rail level.

With regard to water supply, the following table will give information as to the reservoirs which have been constructed, and their capacity :—

RESERVOIRS ON TRANS-AUSTRALIAN RAILWAY.

Distance.				Locality.	Capacity in Gallons.
Ex Kalgoorlie.		Ex Port Augusta.			
Miles.	Chains.	Miles.	Chains.		
69	0	...		Karonie	7,000,000
104	40	...		—	7,000,000
132	40	...		—	3,000,000
...		53	0	Bookaloo	6,000,000
...		94	0	Wirappa	5,000,000
...		130	0	Burando	5,000,000
...		190	0	Kultanaby...	8,000,000
...		250	0	Wilgena	5,000,000

Borings for water have been made at many points along the line. In certain cases the daily supply from some of the bores is but small, and the water obtained not satisfactory for locomotive purposes. In other cases the results have been more satisfactory. In this connection it may be mentioned that at one stage of the line, 337 miles in length, there was not any local water to be obtained, and all the water required for locomotives, machinery, men, and animals on that stage had to be conveyed by rail.

Owing to the natural difficulties on the route, which have already been referred to, the Railway Department had to cater and provide for the staff entirely, such operations necessarily entailing a large amount of extra work other than that of the actual construction of the line. These duties have still to be performed for the permanent staff employed along the line, and a mixed train is being run once a week in order to carry the necessary supplies. This train is known as the "Bread and Butter" train.

The passenger rolling stock in use is mounted on two four-wheel bogies, the cars having a length of 65 feet. There are two classes, first and second, both of which have sleeping accommodation. In addition there are dining and lounge cars (the latter for the first-class only). This stock runs very easily notwithstanding the absence of ballast for the major portion of the line. It is, however, the intention to introduce much larger cars when the conditions for their construction become more favorable.

The passenger locomotives are of a type similar to those which have done good service on the New South Wales Government railways. They are of the 4.6.0 type, with driving wheels 5 ft. in diameter, and cylinders 20 in. x 26 in., the working pressure of the boiler being 160 lbs. These are known as the "G" class. The goods or freight engines are also of a type which has been in use on the New South Wales Government railways for some years. They are known as the "K" class, and are of the 4.8.0. type, with driving wheels 4 ft. 3 in. in diameter, and cylinders 22 in. x 26 in. The boilers have superheaters.

The time allowed for the journey from Port Augusta to Kalgoorlie has been fixed at 37 hours 20 minutes (actual), which gives an average speed of 28.16 miles per hour throughout, inclusive of stoppages. Exclusive of stoppages, which aggregate slightly under three hours, the average is about 30.5 miles per hour. In the opposite direction the gross time is 37 hours 30 minutes (actual), which gives an average speed of 28.03 miles per hour. Exclusive of stoppages, which aggregate about 3 hours 10 minutes, the average is 30.6 miles per hour.

The greatest elevation of the line above sea level is at a point 101 miles east of Kalgoorlie, where it is 1326 feet. This is a rise of 86 feet above Kalgoorlie. Port Augusta is only 21 feet above sea level. With the exception of a short distance of 1 in 80, the ruling grade is 1 in 100.

On the 22nd October, 1917, the first through train left Port Augusta with an official party on board for Kalgoorlie. It should be mentioned that owing to deviations from the original route, the length of this line was reduced from 1063.39 miles to 1051.73 miles, a saving of 11.66 miles.

5. **Federal Territory Railway—Queanbeyan-Canberra.**—This line was built by the Railway Construction Branch of the Public Works Department, New South Wales, and was completed and taken over by the Chief Commissioner of Railways for that State, who has since worked the line for and on behalf of the Commonwealth Government. The line was opened for departmental goods traffic on 25th May, 1914. It connects with the New South Wales railway system at Queanbeyan, and is 4.94 miles in length, in addition to which the sidings cover 2.75 miles.

6. **Summary of Federal Railways.**—The following table shews the railway lines open for traffic under the control of the Commonwealth at 30th June, 1917, together with the lines under construction and those which have been or are being surveyed:—

FEDERAL GOVERNMENT RAILWAYS, 30th JUNE, 1917.

Terminals.	Miles.
OPEN FOR TRAFFIC.	
Darwin to Katherine (Northern Territory)	199.56
Oodnadatta (South Australia)	477.96
Federal Territory (Canberra line)	4.94
Trans-Australian—Kalgoorlie to 546.49 miles	546.49
Port Augusta to 411.71 miles	411.71
Total opened for traffic	1640.66
UNDER CONSTRUCTION.	
Kalgoorlie (Western Australia) to Port Augusta (South Australia)	93.53
SURVEYED OR BEING SURVEYED.	
Katherine River to Mataranka (Northern Territory)	64.50
Mataranka to Daly Waters (Northern Territory)	95.00
Kingoonya to Boorthanna (South Australia)	176.44
Canberra (Federal Territory) to Jervis Bay (New South Wales)	140.23
Canberra (Federal Territory) to Federal Territory Border in the direction of Yass (New South Wales)	11.67
Daly Waters (Northern Territory) to Oodnadatta (South Australia) ...	851.50
Total surveyed or being surveyed	1339.34

7. Average Miles Worked, Cost of Construction, Revenue, Expenditure, Train Mileage, Number of Passenger Journeys, and Tonnage of Goods and Live Stock carried on Federal Railways.—In the following table will be found particulars of the average